

JAPAN

EDICT OF GOVERNMENT

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JIS B 4711 (1991) (English): Cutter blocks for wood planing

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The citizens of a nation must honor the laws of the land.

Fukuzawa Yukichi

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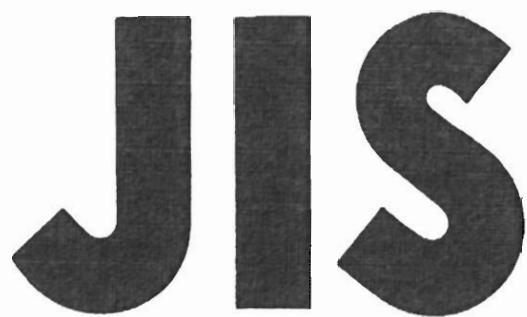


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JAPANESE INDUSTRIAL STANDARD

Cutter blocks for wood planing

JIS B 4711-1991

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

1. Scope

This Japanese Industrial Standard specifies the rotary cutter blocks for wood planing (hereafter referred to as the "cutter blocks") using flat planing knives.

Remarks 1. The applicable Standards to this Standard are given in the following.

JIS B 0601-Definitions and Designation of Surface Roughness

JIS B 0659-Roughness Comparison Specimens

JIS B 0905-Balance Quality Requirements of Rigid Rotors

JIS B 7507-Vernier Callipers

JIS B 7514-Steel Straightedges

JIS B 7516-Metal Rules

JIS B 7526-Squares

JIS B 7540-Vee Blocks

JIS B 7737-Balancing Machines

JIS G 4051-Carbon Steels for Machine Structural Use

2. The units and numerical values given in { } in this Standard are in accordance with the traditional units, and are appended for informative reference.

2. Definitions

For the purposes of this Standard the following definitions apply.

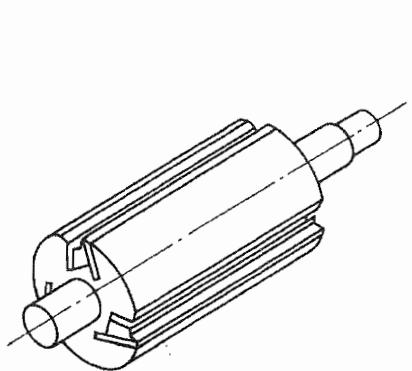
- (1) cutter block In a rotary cutter block for wood planing, that part to which flat planing knives are to be mounted. There is that has been mounted with a cutter head to a main spindle, or that has been integrated with a main spindle and a cutter head, and the cutter head consists of a cutter block body, back knife, knife retainer, clamping screw, etc.
- (2) tip end circle diameter The diameter of an imaginary circle which is described by the tip end of a flat planing knife mounted on the cutter block (see Table 2 and Table 4).
- (3) diagonal length The distance between the tip ends of back knife part in diagonal direction of a cubic block (see Table 4).

3. Types

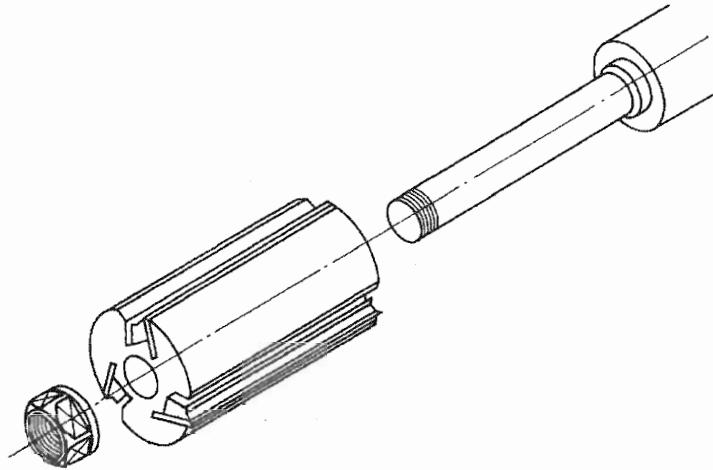
The types of the cutter blocks shall be 6 types of the round block solid type, round block separated type and round block assembled type (hereafter referred to as the "round blocks"), and cubic block solid type, cubic block separated type and cubic block 2-knife type (hereafter referred to as the "cubic blocks") (see Fig. 1).

Fig. 1. Types

(1) Round block solid type

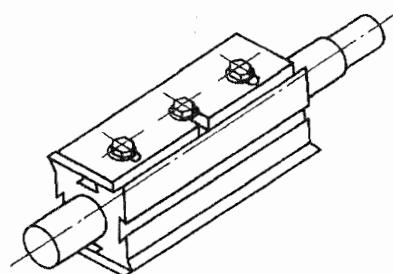
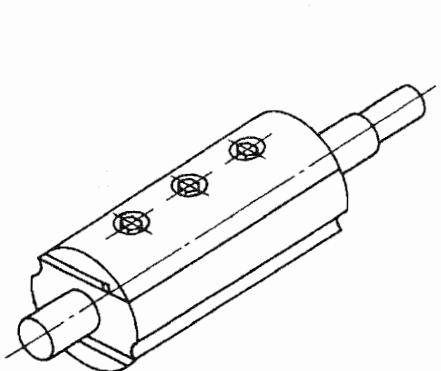


(2) Round block separated type

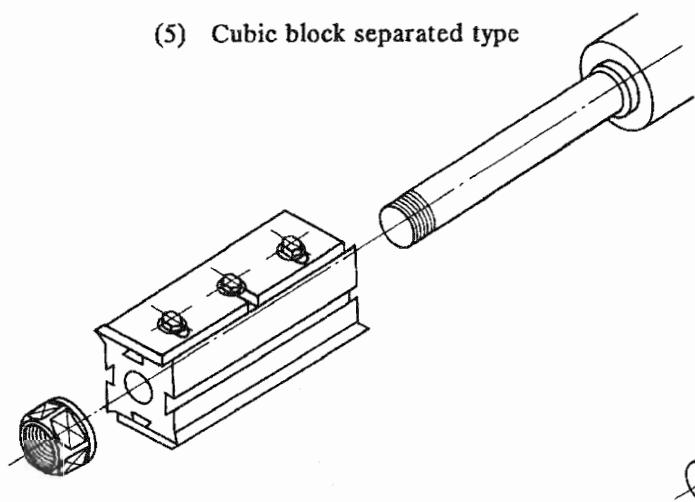


(4) Cubic block solid type

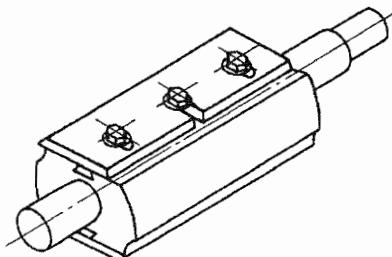
(3) Round block assembled type



(5) Cubic block separated type



(6) Cubic block 2-knife type



Remarks: Figures indicate examples respectively, but these do not specify constructions.

4. Cutter Block Bodies

The cutter block bodies shall be in accordance with the following:

4.1 Construction The cutter block bodies have sufficient rigidity, and are those which are not influential to machining accuracies.

4.2 Shapes and dimensions The shape and dimensions of the cutter block bodies are in accordance with the following (see Fig. 1).

- (1) The shape and dimensions of the round blocks are in accordance with Table 1 and Table 2.

Table 1. Length of Round Block

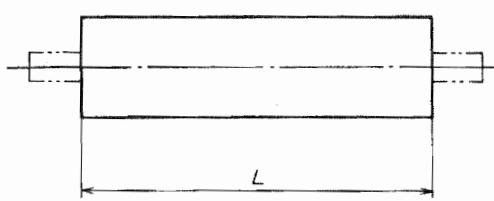
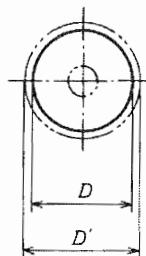


Table 2. Diameter of Round Block



Unit: mm	
Length <i>L</i>	Tolerances
Basic dimension	
50	± 0.5
60	
70	
80	
90	
100	
125	
150	
175	
200	
250	
300	
350	± 0.7
400	
450	
500	
600	± 1.0
750	
900	

Unit: mm	
Diameter <i>D</i>	
Basic dimension	Tolerances
52	± 1.0
62	
72	
82	
87	
92	
97	
102	
107	
112	
117	
122	
127	
132	
137	
142	
147	
152	
157	

Diameter of tip end circle *D'*
(Informative reference)

(2) The shape and dimensions of cubic blocks are in accordance with Table 3 and Table 4.

Table 3. Lengths of Cubic Blocks and Clamping Positions of Planing Knife

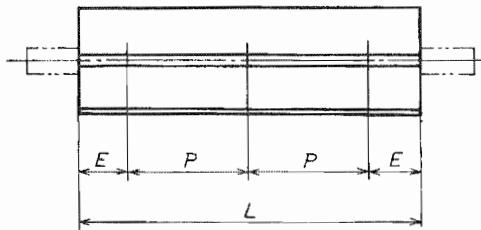
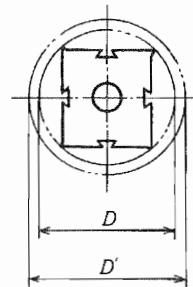


Table 4. Diagonal Lengths of Cubic Blocks



Length L		Clamping screw			Number	Unit: mm		
Basic dimension	Tolerances	Position		Number				
		P	E					
50	± 0.5	0	25	1				
60		0	30					
70		35	17.5	2				
80		40	20					
90		45	22.5					
100		50	25	2				
125		75						
150		50	25	3				
175		60	27.5	3				
200		75	25					
250		65	27.5	4				
300		80	30					
350		75	25	5				
400	± 0.7	85	30					
450		95	35					
500		90	25	6				
600		90	30	7				
750	± 1.0	100	25	8				
900		105	30	9				

Diameter (diagonal length) D	Diameter of tip end circle D' (Informative reference)		Unit: mm
	Basic dimension	Tolerances	
52		± 1.0	55
62			65
72			75
82			85
87			90
92			95
97			100
102			105
107			110
112			115
117			120
122			125
127			130
132			135
137			140
142			145
147			150
152			155
157			160

4.3 Runout and Cylindricity for Outer Periphery of Body The permissible value of runout for outer periphery of body is to be 0.03 mm and the permissible value of cylindricity, 0.05 mm.

4.4 Balance Quality The balance quality of the cutter block body is to be of two-plane balancing, and the grade G 6.3 or better of the balance quality specified in JIS B 0905.

4.5 Straightness of Mounting Plane of Planing Knife The straightness of mounting face of planing knife is to be in accordance with the following:

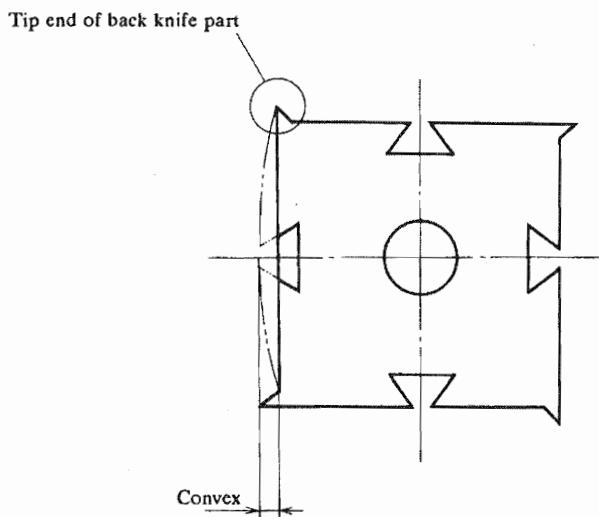
(1) The straightness in lengthwise direction is in accordance with Table 5.

Table 5. Straightness of Mounting Plane of Planing Knife
Unit: mm

Length of mounting plane of planing knife	Permissible value
50 or over to 600 or under	0.2 per 1000
Over 600 to 900 or under	0.4 per 1000

(2) The widthwise direction of the cubic block must not be convex (see Fig. 2).

Fig. 2. Section of Cubic Block

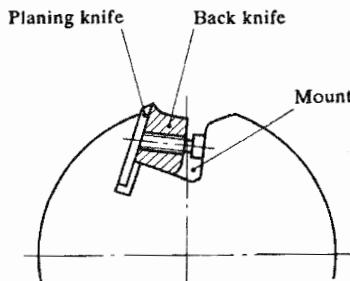


4.6 Surface Roughness of Tip End of Back Knife Part of Cubic Block The surface roughness of the tip end of back knife part of cubic block is to be 6.3 a (25 S) specified in JIS B 0601 (see Fig. 2).

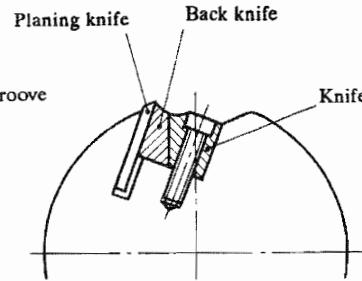
4.7 Construction of Planing-Knife Mounting Groove of Round Block The planing-knife mounting groove of the round block, when the knife has been mounted by the methods of (1) to (3) of Fig. 3, is to be constructed so that the knife is not projected by the centrifugal force.

Fig. 3. Mounting Methods of Planing Knife

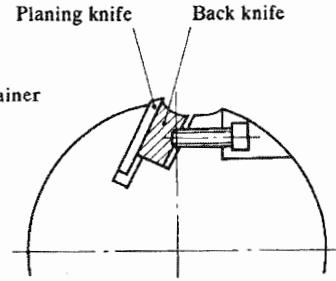
(1) A method to make the section of mounting groove to wedge form



(2) A method to make the section of knife retainer to wedge form



(3) A method to press the back knife with a screw



Remarks: Figures indicate examples, and these do not specify the constructions.

5. Back Knives to be Used in Round Blocks

5.1 Straightness of Planing Knife Contacting Plane The straightness of planing knife contacting plane shall be in accordance with the following:

(1) The straightness in lengthwise direction is in accordance with Table 6.

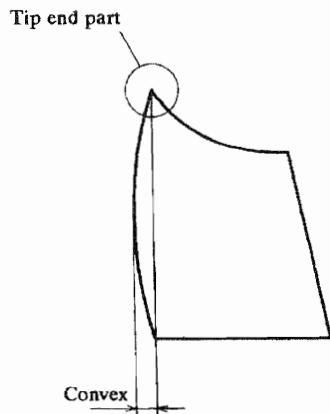
Table 6. Straightness of Planing Knife Contacting Plane

Unit: mm

Length of planing knife contacting plane	Permissible value
50 or over to 300 or under	0.4 per 1000
Over 300 to 900 or under	0.8 per 1000

(2) In widthwise direction, it is not to be convex (see Fig. 4).

Fig. 4. Section of Back Knife



5.2 Surface Roughness of Back Knife Tip end Part The surface roughness in lengthwise direction of the back knife tip end part shall be 6.3 a (25 S) specified in JIS B 0601 (see Fig. 4).

5.3 Tapping of Back Knife The tapping of the back knife shall be such that the direction of its centre line is not impedimental to clamp the planing knife sufficiently and easily, in respect to the planing knife mounting plane of cutter block.

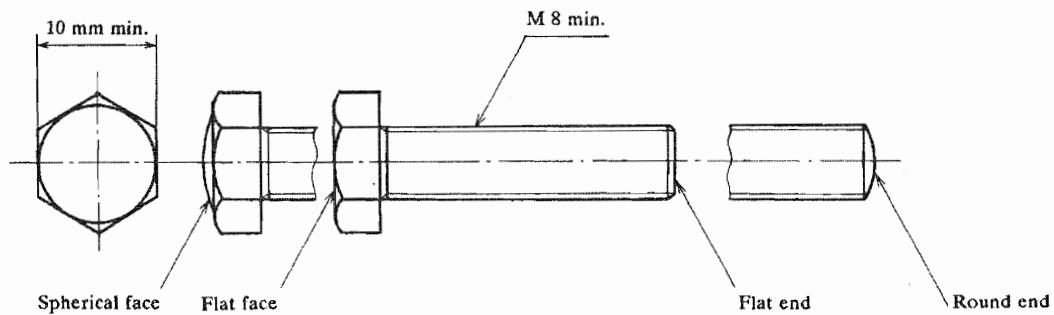
5.4 Mounting of Back Knife The back knife shall be so constructed that the tip end is capable of being mounted so as not to project 2 mm or over from the outer peripheral surface of cutting block body.

6. Clamping Screw

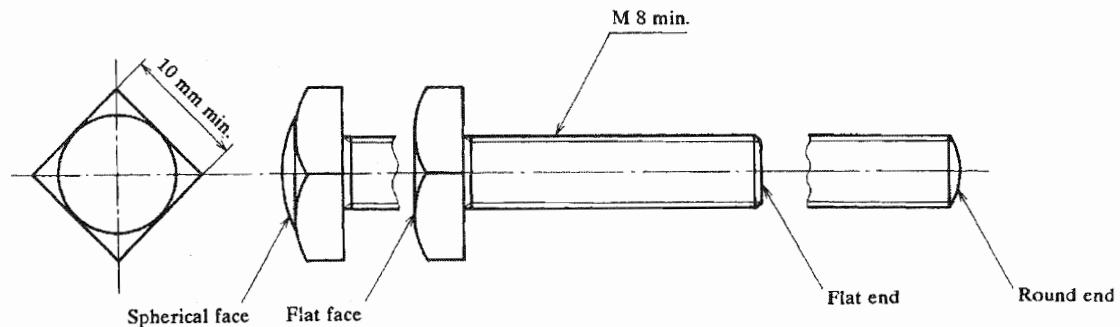
The dimensions and the shapes of head and end of the clamping screw shall be in accordance with Fig. 5.

Fig. 5. Clamping Screws

(a) Hexagonal clamping screw



(b) Square clamping screw



7. Material

The material of the back knife of cutter block body and clamping screw shall be in accordance with the following:

- (1) The material of the round block and back knife shall be S 45 C of JIS G 4051 or that having mechanical properties equal or superior thereto. The tip end of the back knife is to be treated with quenching, tempering and other treatment to improve abrasion resistance.
- (2) The materials of the cubic block and clamping screw are to be S 35 C of JIS G 4051 or that having mechanical properties equal or superior thereto. The tip end of the back knife is to be treated with quenching, tempering and other treatment to heighten abrasion resistance.

8. Testing Methods

8.1 Shapes and Dimensions of Cutter Block The tests on shapes and dimensions of the cutter block body, back knife and clamping screw shall be in accordance with Table 7.

Table 7. Testing Methods

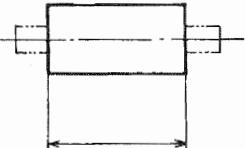
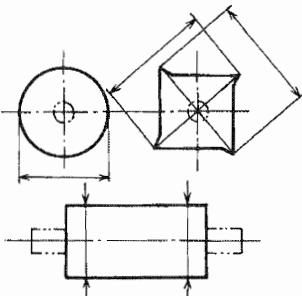
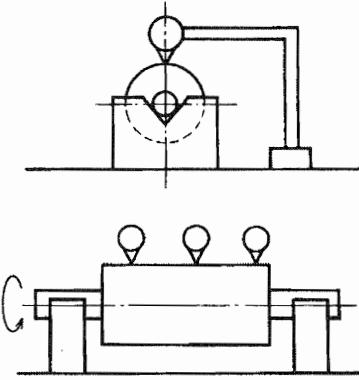
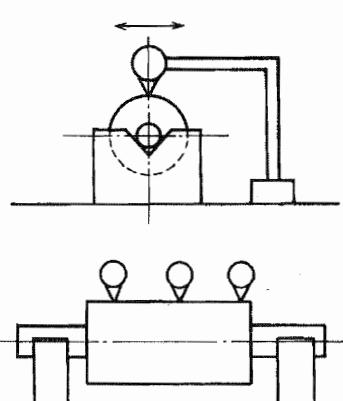
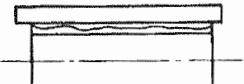
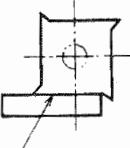
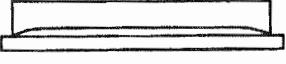
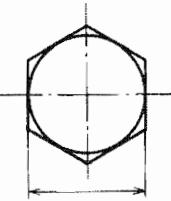
No.	Item	Measuring method	Diagram of inspection method	Measuring instrument
1	Length of cutter block body	<p>Measure the length with a vernier calipers or metal rule along the planing knife mounting groove of the cutter block body.</p> <p>Furthermore, for the cubic block, measure the lengthwise direction of the back knife part.</p>		Vernier calipers of grade 1 of JIS B 7507, or metal rule of type C grade 2 of JIS B 7516
2	Diameter or diagonal length of cutter block body	<p>Measure the diameter or diagonal length of cutter block body with a vernier calipers at 2 places in lengthwise direction.</p> <p>Furthermore, for the cubic block, measure the all of the diagonal lengths.</p>		Vernier calipers
3	Runout of outer periphery of cutter block body (round block)	<p>Place the cutter block on a surface plate supporting the bearing parts of cutter block body with 2 pieces of V-block, apply a dial gauge to the both ends⁽¹⁾ and centre of the cutter block, rotate the cutter block with hands, and consider the maximum difference of readings there of to be the measured value.</p> <p>For the separated type cutter block, carry out measurement using a test bar.</p>		Test bar, 0.01 mm scale dial gauge, precision surface plate and V-blocks of grade 1 of JIS B 7540
4	Cylindricity of cutter block body (round block)	<p>Place the cutting block on a surface plate, supporting the bearing part of cutter block body with 2 pieces of V-block, read the heights of outer periphery at both ends⁽¹⁾ and centre part of the cutter block by using a dial gauge, and consider the maximum difference to be the measured value.</p> <p>Carry out this measurement each on the outer periphery divided into equal parts to the number of teeth.</p> <p>For the separated type cutter block, carry out measurement by using a test bar.</p>		Test bar, 0.01 mm scale dial gauge, precision surface plate and V-blocks

Fig. 7 (Continued)

No.	Item	Measuring method	Diagram of inspection method	Measuring instrument
5	Straightness of planing knife mounting plane	Lengthwise direction Apply a straightedge to the mounting plane of planing knife, and measure the clearances with a feeler gauge. Carry out measurements on all of the planing knife mounting planes.		Straightedge of grade A of JIS B 7514, and feeler gauge
		Widthwise direction Confirm that the plane is not convex by visual inspection, by applying a straightedge or square. Carry out measurements on all of the planing knife contacting planes.	 Mounting plane of planing knife	Straightedge, and square of grade 2 of JIS B 7526
6	Straightness of planing knife contacting plane of back knife (round block)	Lengthwise direction Apply a straightedge to the planing knife contacting plane of back knife, and measure the clearances with a feeler gauge. Carry out measurements on all of the planing knife contacting planes.		Straightedge and feeler gauge
		Widthwise direction Apply the planing knife contacting plane to a surface plate, and confirm that the plane is not convex. Carry out measurements on all of the planing knife contacting planes.	 Planing knife contacting plane	Precision surface plate
7	Width across flat of clamping screw	Measure the width across flat using a vernier calipers. Carry out this measurement on each width across flat.		Vernier calipers

Note ⁽¹⁾) Measure avoiding the parts of shear drop.

8.2 Balance Quality of Cutter Block Body The balance quality of the cutter block body shall be measured by using the tester specified in JIS B 7737. However, this measurement shall be carried out without mounting planing knives.

8.3 Surface Roughnesses of Back Knife Tip End Part of Round Block and Back Knife Tip End of Cubic Block The surface roughnesses of the back knife tip end part of the round block and the back knife tip end of the cubic block shall be examined by visual inspection by using the standard specimens specified in JIS B 0659.

9. Inspection

The inspection of the cutter block shall be carried out on the shape and dimensions, runout of body outer periphery, cylindricity, balance quality, straightness of planing knife mounting plane, straightness of planing knife contacting plane of back knife, surface roughness of back knife tip end part (round block) or back knife tip end (cubic block) and clamping screw in accordance with 8., and the results shall comply with the requirements of 4.2 to 4.6, 5.1, 5.2 and 6. respectively.

10. Designation of Products

The cutter block shall be designated by the number of Standard or title of Standard, type and dimensions (length × diameter or diagonal length).

Examples: JIS B 4711 Round block solid type 100 × 102

Cutter blocks for wood planing Round block solid type 100 × 102

11. Marking

The product shall be marked with the following information on an appropriate position.

(1) Dimensions (length × diameter or diagonal length)

Example: 100 mm × 102 mm

(2) Rake angle⁽²⁾

Example: 30°

(3) Permissible speed of rotation

Example: 5000 min⁻¹ {rpm}

(4) Manufacturer's name or its number

Example: OOOO

Note ⁽²⁾ The value to which the design tip end circle has been taken as reference.

Reference Standards:

JIS B 0114-Glossary of Terms for Wood Working Machinery

JIS B 4709-Planer Knives for Woodworking Machines

JIS B 6502-Test Methods for Performance and Accuracy of Wood Planers

JIS B 6601-Safety Standards for Construction of Single Surface Planers

JIS B 6602-Safety Standards for Construction of Spindle Shapers

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